



# Overview of Four Corners Air Quality

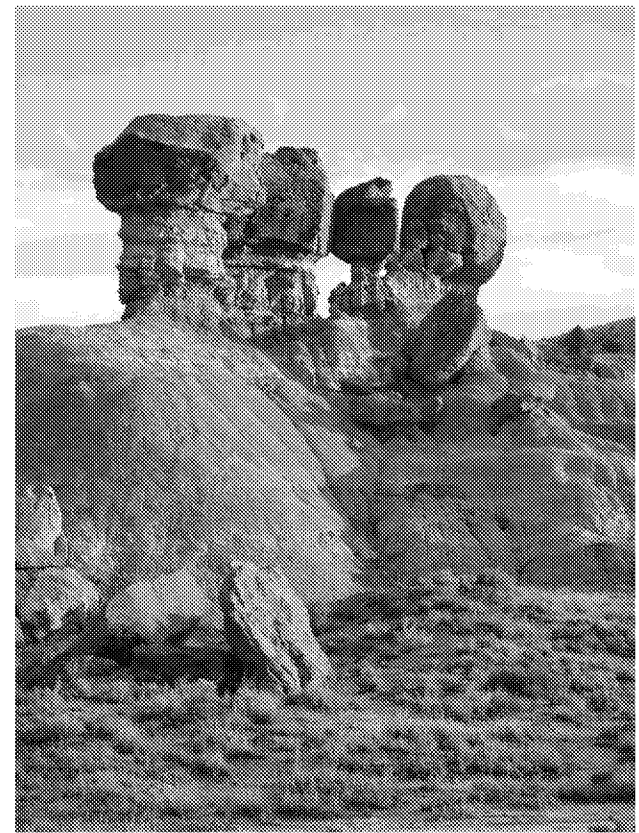
WRAP – Oil and Gas Work Group

April 9, 2018

Mark Jones, NM Environment Department

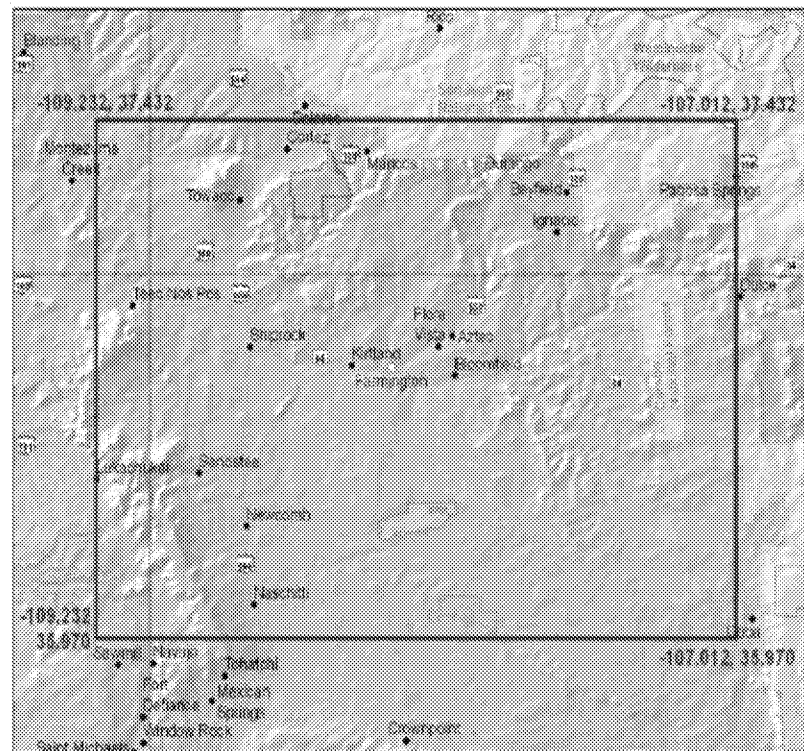
# Outline

- Four Corners Air Quality Group
  - Task Force
  - Current Activities
- Regional Studies and Emissions Sources
- Four Corners Agency Updates and Control Measures
- Ambient Air Monitoring Data and Trends



# Four Corners Air Quality Task Force: Background

- States of Colorado and New Mexico convened the Four Corners Task Force in late 2005.
  - Goals: Address air quality issues in Four Corners region & consider mitigation options for air pollution.
  - Comprised of more than 100 members and 150 interested parties.
- Jurisdictional array primary driver for task force.
  - Four states, federal agencies (EPA Regions 6,8 & 9, BLM, NPS, USFS), and tribal governments (Navajo Nation, Ute Mtn. Ute, Jicarilla Apache, and Southern Ute).
- Ozone, particulate matter and mercury of particular concern as regional AQ issues.



Focus Area Map

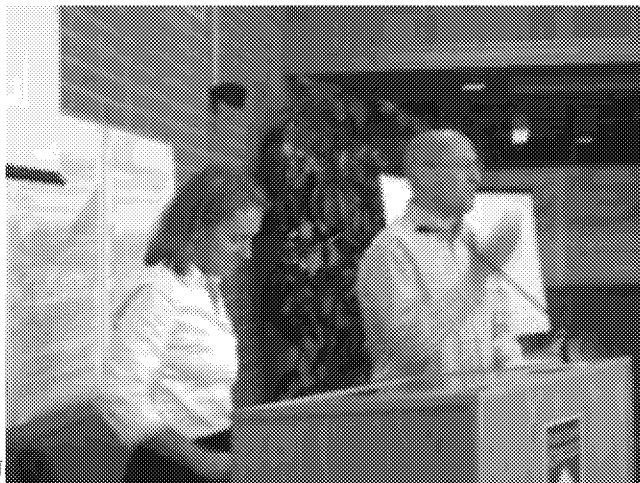
# Four Corners Air Quality Task Force Meetings



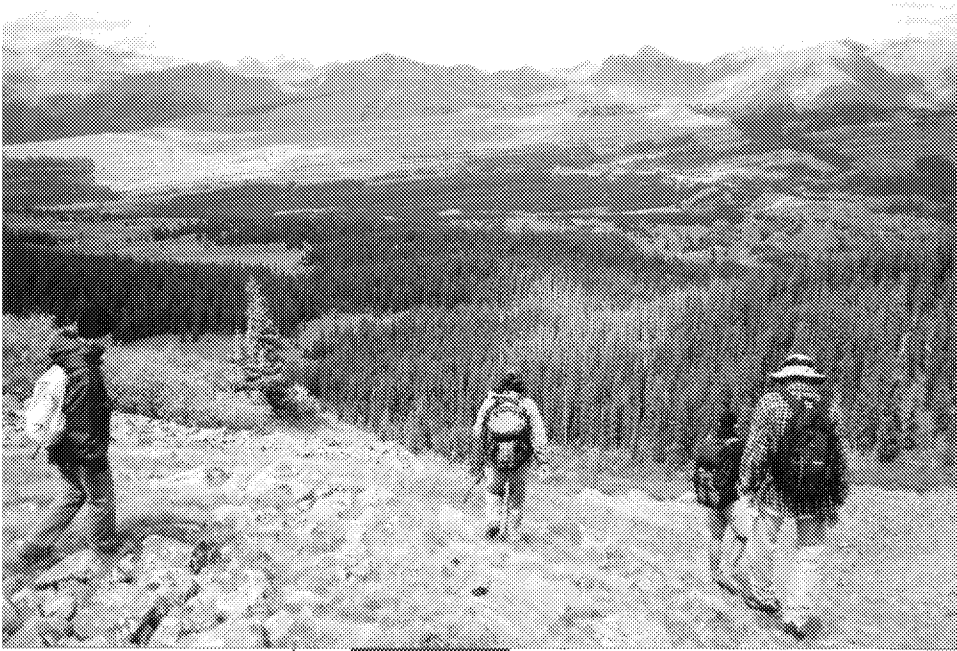
Cortez, CO - 2005



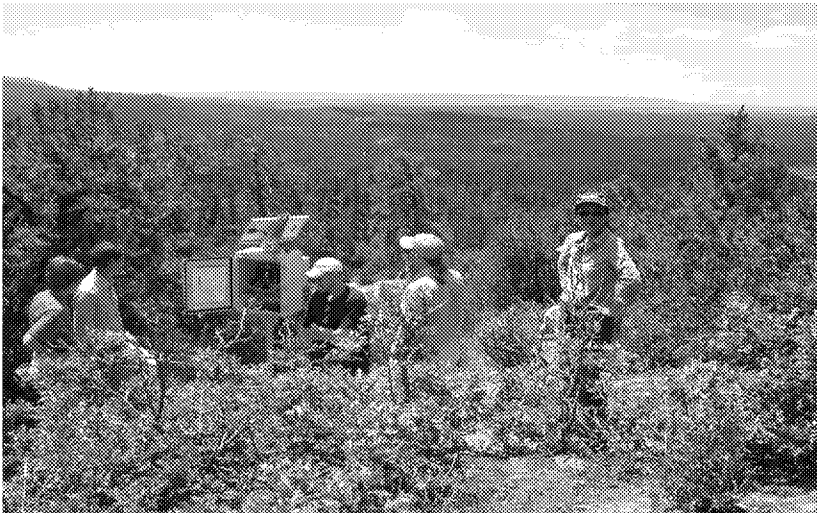
Durango, CO – 2007



# Field Trips



Hike to Molas High Mountain Lake

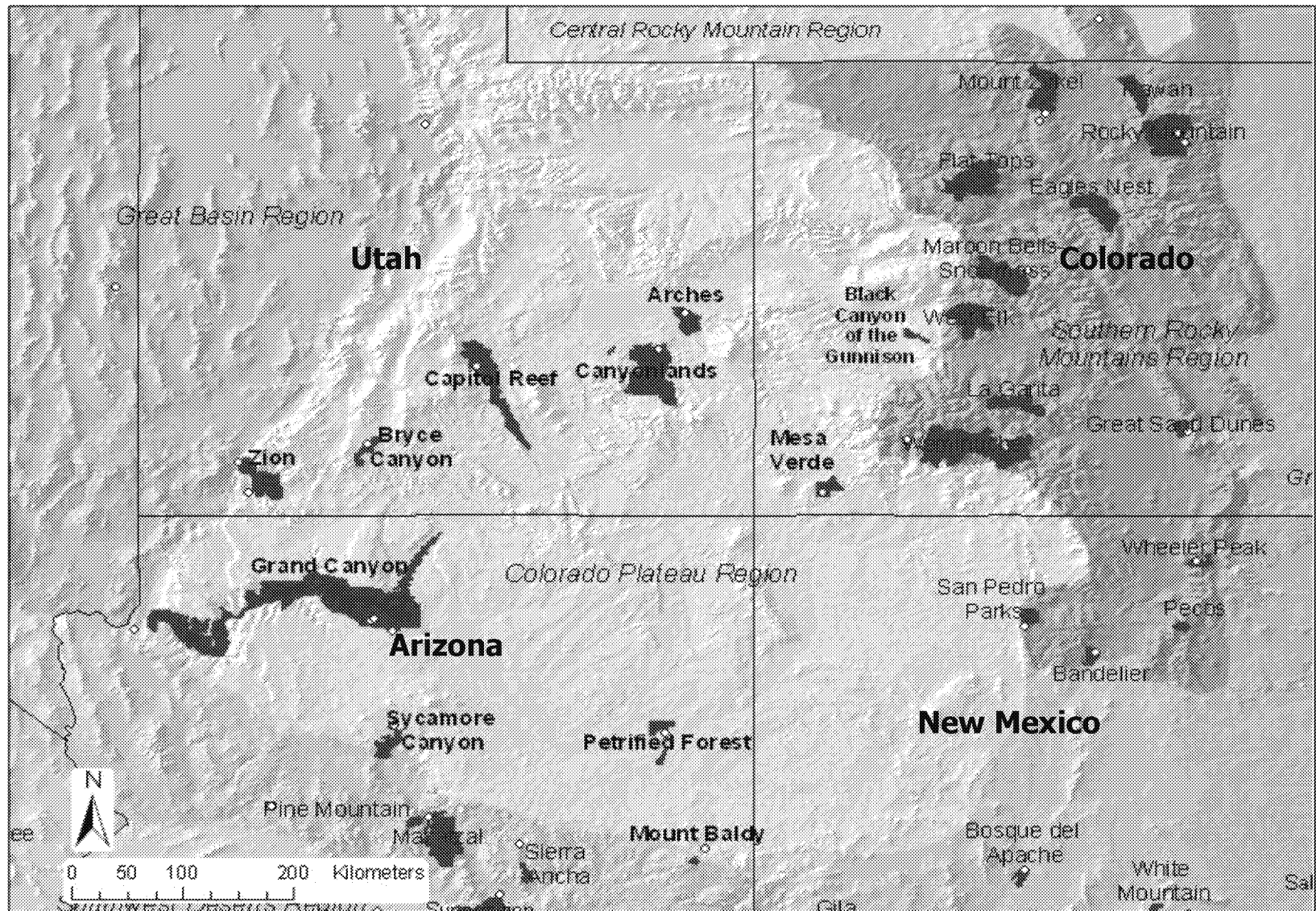


Shamrock Improve site near Bayfield, CO



Four Corners Power Plants<sub>5</sub>

# Class I Areas in the Four Corners

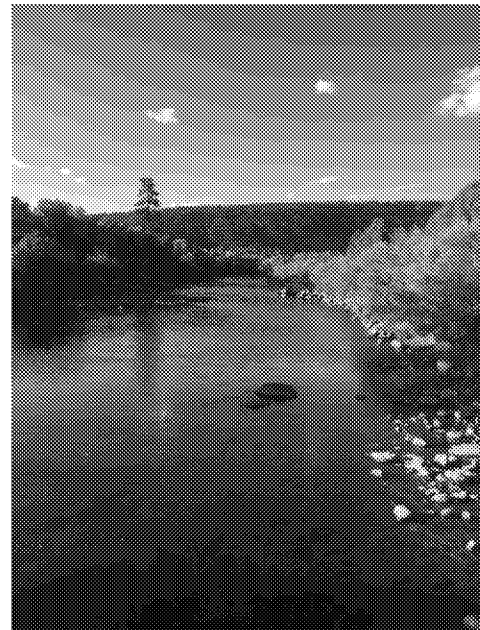


June 16, 2011



# Four Corners Air Quality Task Force

- Task Force divided into five working teams
  - Power Plants, Oil and Gas, Other Sources, Cumulative Effects, and Monitoring.
- Published report after two-year effort (2005 – 2007) of a compendium of options to address air quality concerns.
  - More than 125 mitigation options organized by source sector.
  - Monitoring section discusses analysis gaps and ideas for improved monitoring in area.
  - Cumulative effects provides quantified estimates of emission reductions for some options as well as ideas for additional analysis.
  - Expression of range of possibilities.
  - Unique and valuable resource for responsible agencies.
  - Additional section on Energy Efficiency, Renewable Energy and Conservation (addresses all sources).



# Four Corners Air Quality Task Force

- Report was considered by agencies as air quality and land management strategies were developed.
- May include developing new and revised regulations, supporting new legislation, developing new outreach and information programs, and developing and/or expanding voluntary programs for emission reductions.
- Examples include: BLM permit requirements, EPA performance standards, and voluntary industry practices.



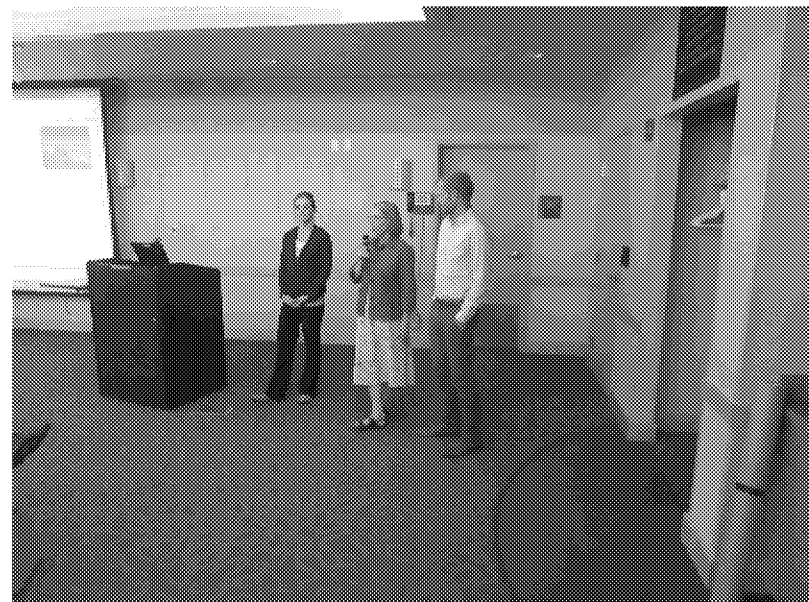


# Four Corners Air Quality Group: Present

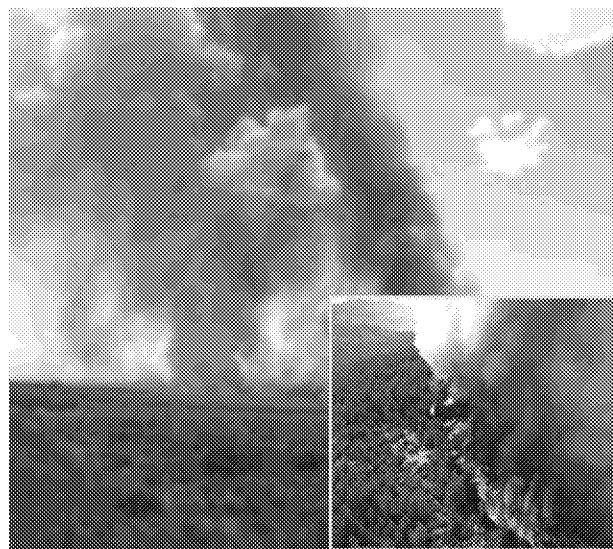
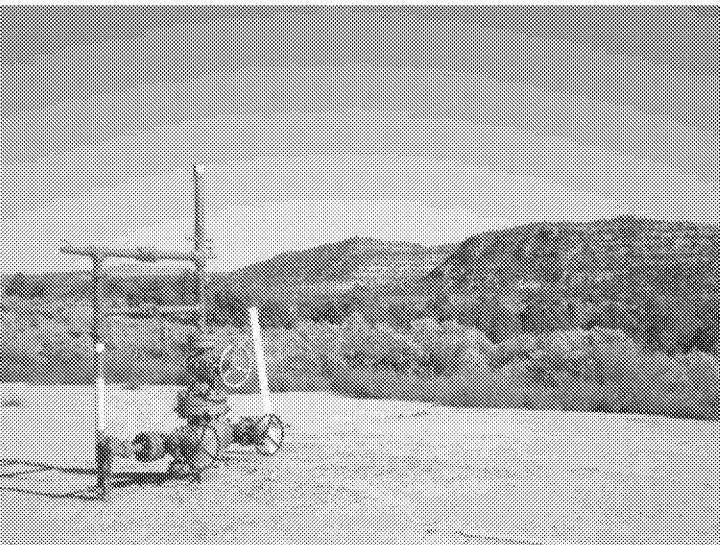
- Four Corners Air Quality Group formed after Task Force finished.
- Agency Policy Oversight Group convenes regularly to discuss progress and regional issues (13 agencies participate) –cooperative MOU.
- Held two specialized methane forums in 2015 and 2017 to further understanding of region's methane measurements.
- Organizes annual public forums for individuals interested in air quality to meet, learn about current conditions, review progress on mitigation of air quality impacts, and generally contribute to clean air in the Four Corners area.
- Website: <https://www.env.nm.gov/air-quality/fcaqg/>.



## 4CAQG 2017 Meeting



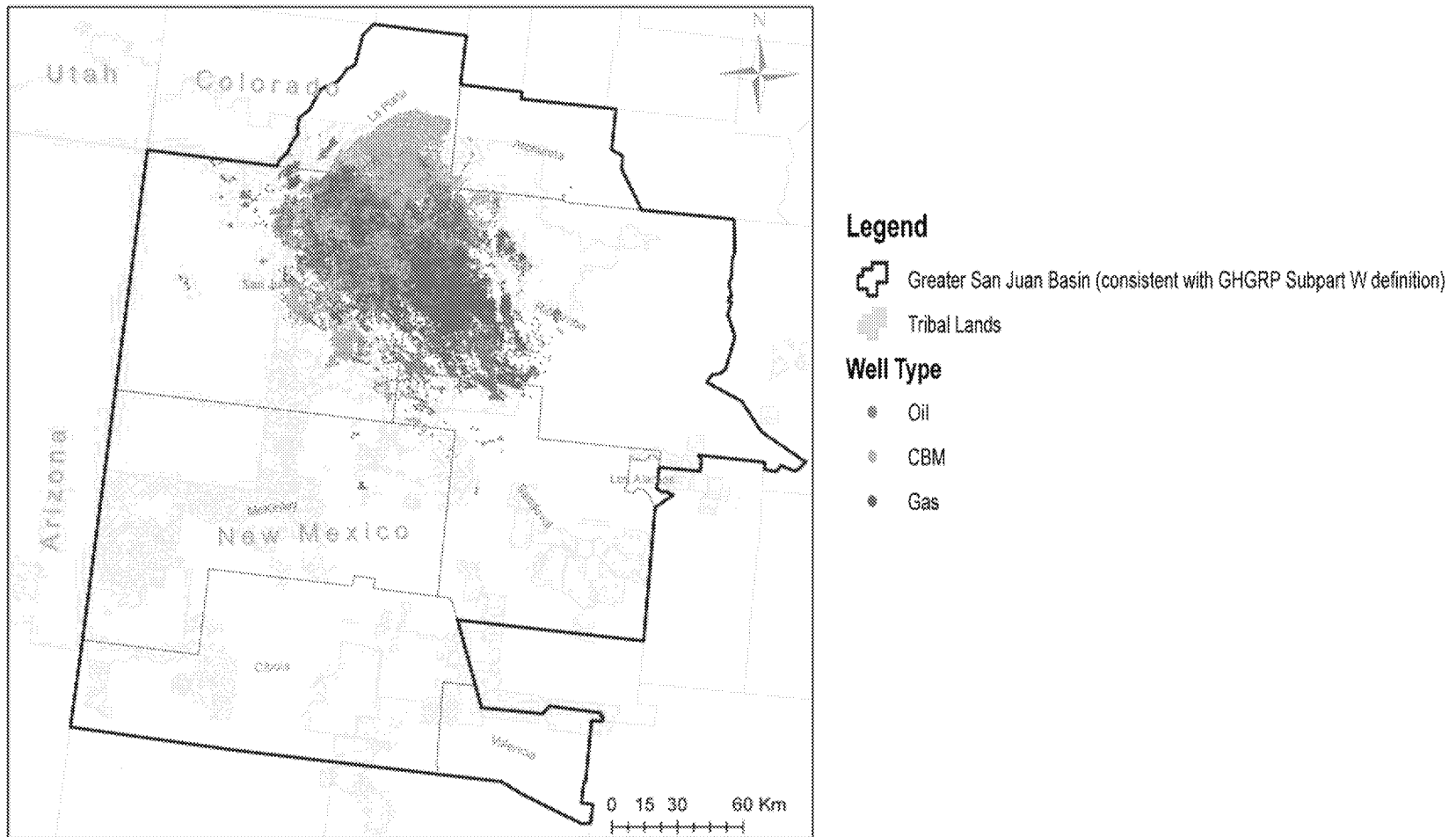
# Four Corners Emission Sources



# Four Corners Studies and Agency Updates

- Four Corners agencies cooperatively prepare an annual agency update on recent projects in the Four Corners and a list of studies in the area. (2008-2017). Available on website: <https://www.env.nm.gov/air-quality/fcaqg/>.
- Studies include a variety of emissions inventories, modeling, and monitoring studies.
- Examples
  - Parikh, R., J. Grant, A. Bar-Ilan. 2017 “Development of Baseline 2014 Emissions from Oil and Gas Activity in Greater San Juan Basin and Permian Basin”. Ramboll Environ. November 2017.
  - Draft Future Year 2028 Emissions from Oil and Gas Activity in the Greater San Juan Basin and Permian Basin. Ramboll Environ.
  - Mark E. Sather, Shaibal Mukerjee, Kara L. Allen, Luther Smith, Johnson Mathew, Clarence Jackson, Ryan Callison, Larry Scrapper, April Hathcoat, Jacque Adam, Danielle Keese, Philip Ketcher, Robert Brunette, Jason Karlstrom, and Gerard Van der Jagt, “Gaseous Oxidized Mercury Dry Deposition Measurements in the Southwestern USA: A Comparison between Texas, Eastern Oklahoma, and the Four Corners Area,” The Scientific World Journal, vol. 2014.
  - Smith, Mackenzie L., Alexander Gvakharia, Eric A. Kort, Colm Sweeney, Stephen A. Conley, Ian Faloona, Tim Newberger, Russell Schnell, Stefan Schwietzke, Sonja Wolter, 2017. Airborne Quantification of Methane Emissions over the Four Corners Region.

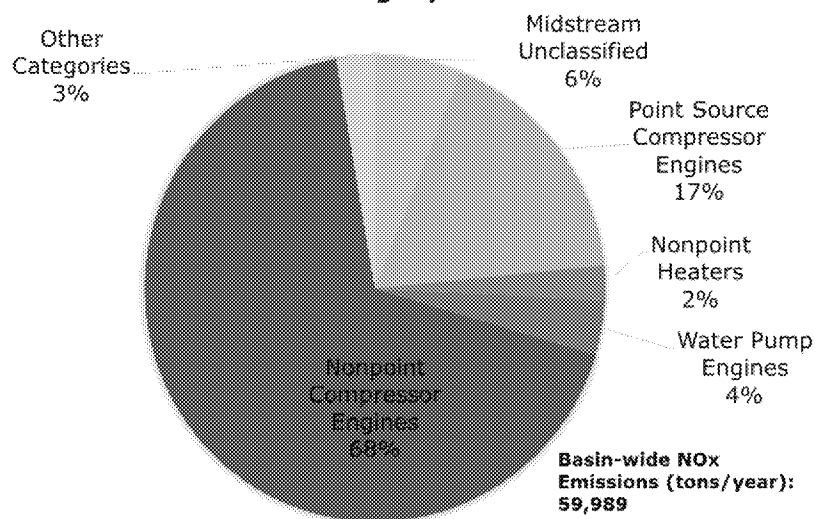
# Greater San Juan Basin: 2014 Well Locations by Type



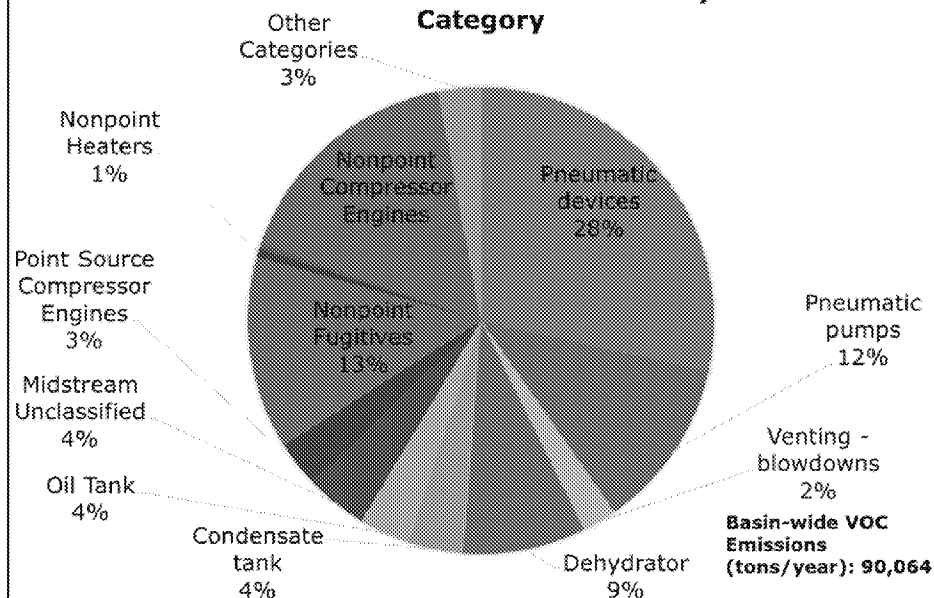
Reference: Parikh, R., J. Grant, A. Bar-Ilan. 2017 "Development of Baseline 2014 Emissions from Oil and Gas Activity in Greater San Juan Basin and Permian Basin". Ramboll Environ. November 2017.

# Greater San Juan Basin 2014 VOC and NOx Emissions by Source Category

**Basin-wide NOx Percent Contribution by Source Category**



**Basin-wide VOC Percent Contribution by Source Category**



Reference: Parikh, R., J. Grant, A. Bar-Ilan. 2017 "Development of Baseline 2014 Emissions from Oil and Gas Activity in Greater San Juan Basin and Permian Basin". Ramboll Environ. November 2017.



# Four Corners Control Measures

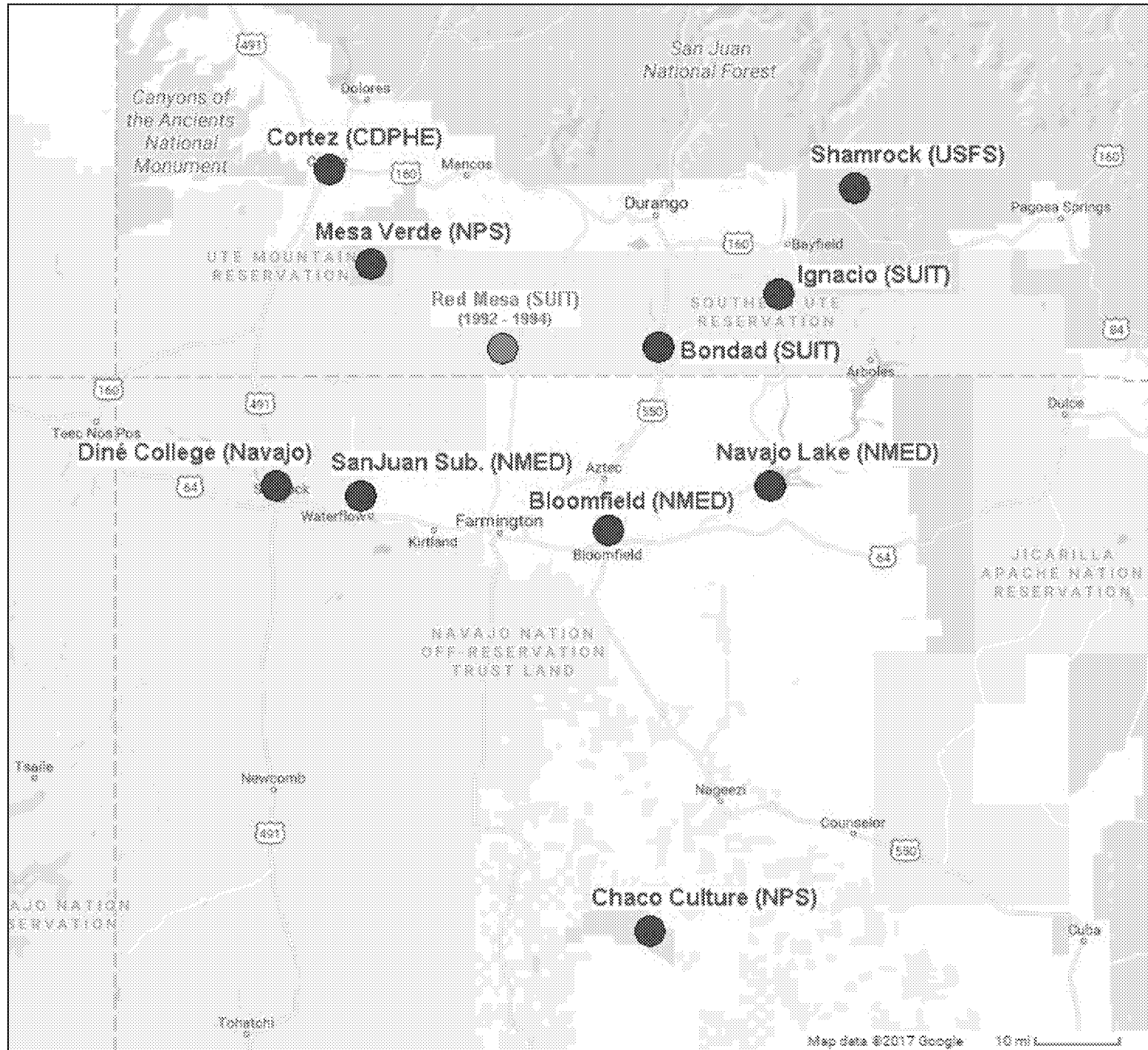
- CO Statewide oil and gas emission controls
- BLM Compressor Engine Standards
- New Mexico Ozone Statute
  - If ozone in New Mexico exceeds 95% of standard, new plan with regulations to reduce ozone precursors is required.
- Smoke management program
- Durango Train Smoke Task Force
- Tribal permitting and control of emission sources
  - SUIT regulations and permitting programs
- Particulate matter control plan for Pagosa Springs includes:
  - Street sweeping and sanding controls, use of chemical deicers, and paving of dirt.
  - roads

# Four Corners Control Measures

- Regional Haze Program requirements
  - Future closure and emissions reductions from additional controls at regional power plants
  - San Juan Generating Station
    - Updated controls in 2009 (all pollutants, including mercury)
    - Closed two units in 2017
    - Installed mid-tier NO<sub>x</sub> controls in 2015 on two units
      - Units will be closed in 2022 according to Integrated Resource Plan.
- Four Corners Power Plant
  - Closing three units
  - Top-tier NO<sub>x</sub> controls on two units in 2018
  - SO<sub>2</sub> and particulate limit tightened
  - Increasing monitoring
  - Environmental Mitigation projects on Navajo Nation

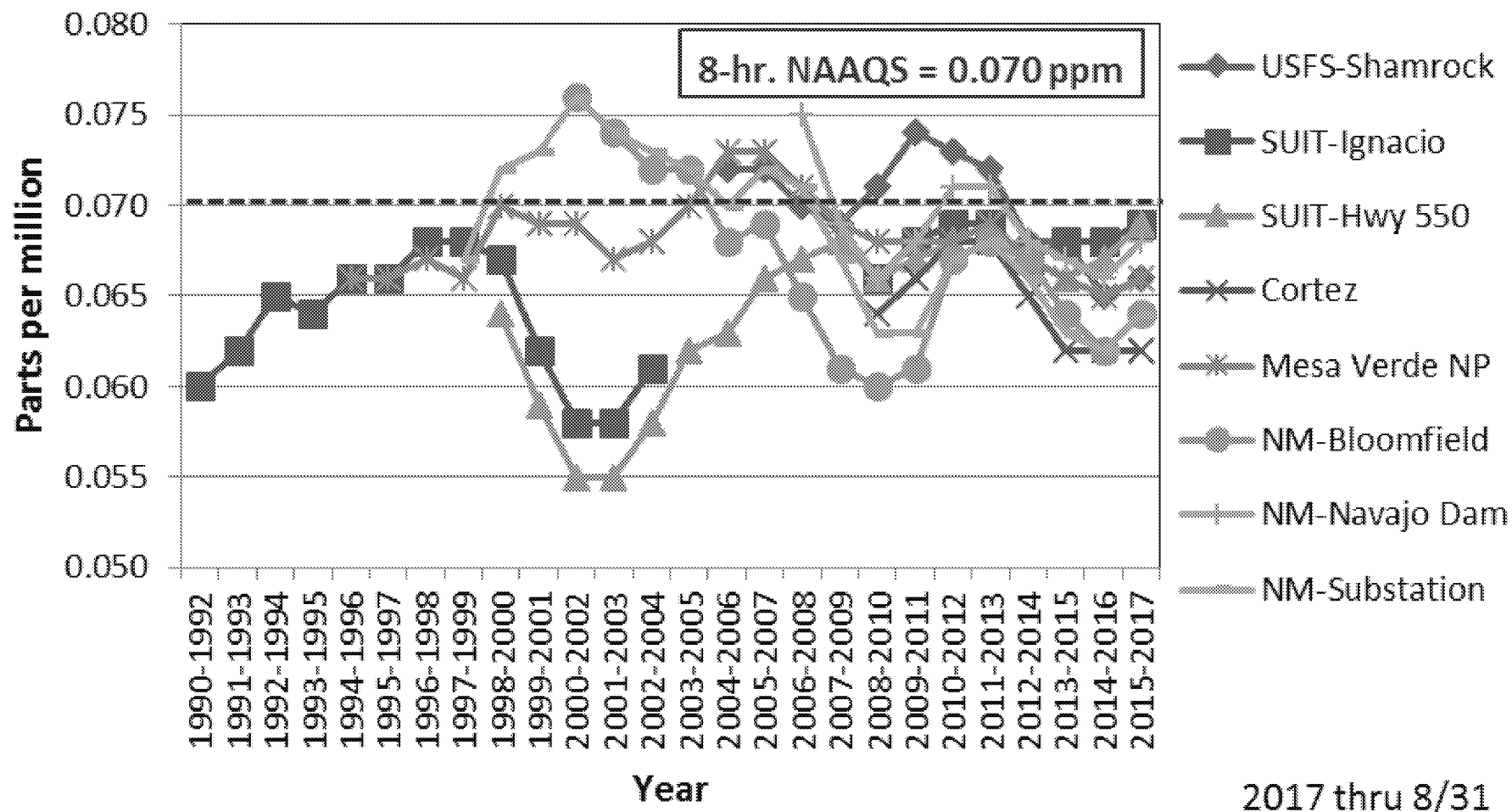
# Monitoring Air Quality Trends

# Ozone Monitoring Sites in the Four Corners Area



# 8-Hour Ozone --- 3-year Avg. of 4th Max.

## Four Corners area



All sites below the current NAAQS

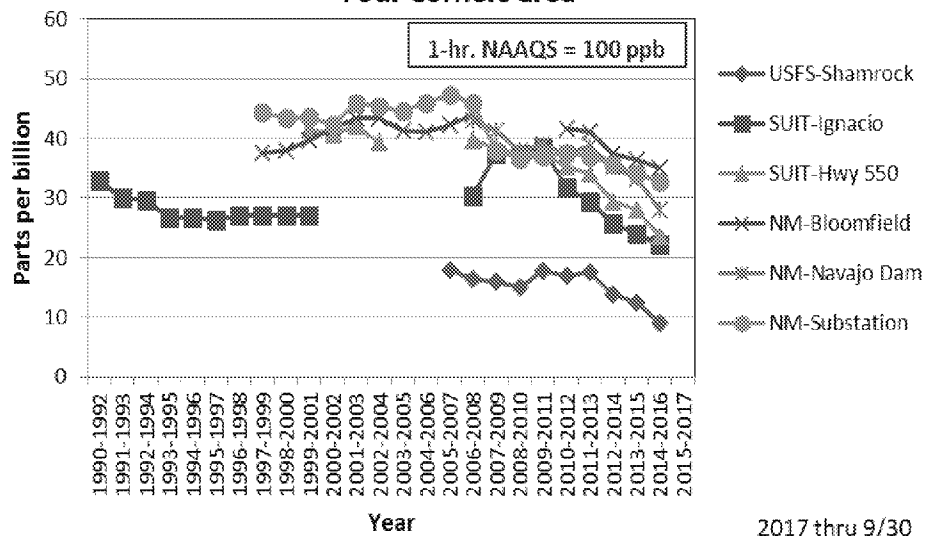
# Other Air Monitoring in the Four-Corners Area (Non-Ozone)

- Particulates
- Oxides of Nitrogen
- Sulfur Dioxide
- Carbon Monoxide
- Ions (nitrate, sulfate, ammonium)
- Ammonia
- Visibility
- Mercury
- Meteorology
- VOC/NMOC



# 1-Hour NO2 --- 3-year Avg. of 98th %ile

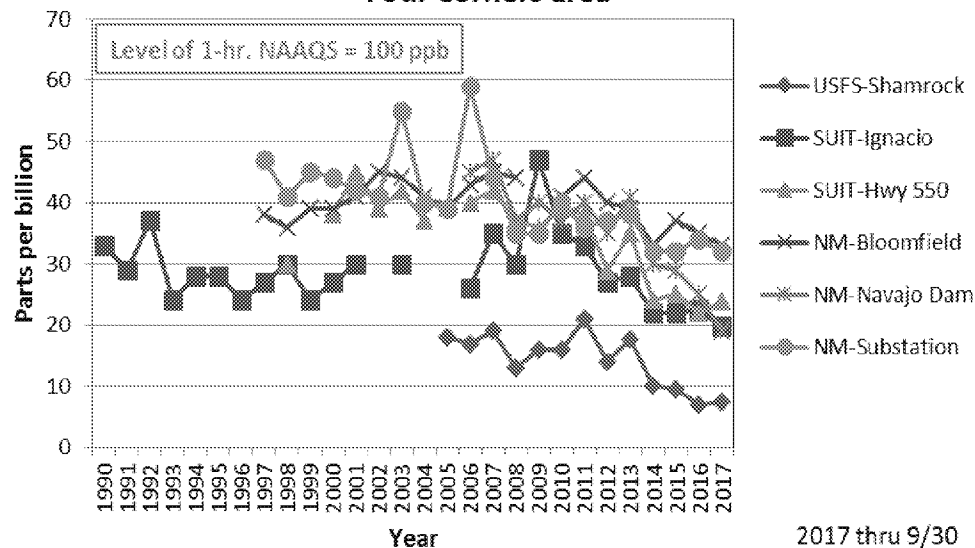
Four Corners area



Monitoring Trends in  
the Four Corners Area:  
Nitrogen Dioxide (NO<sub>2</sub>)

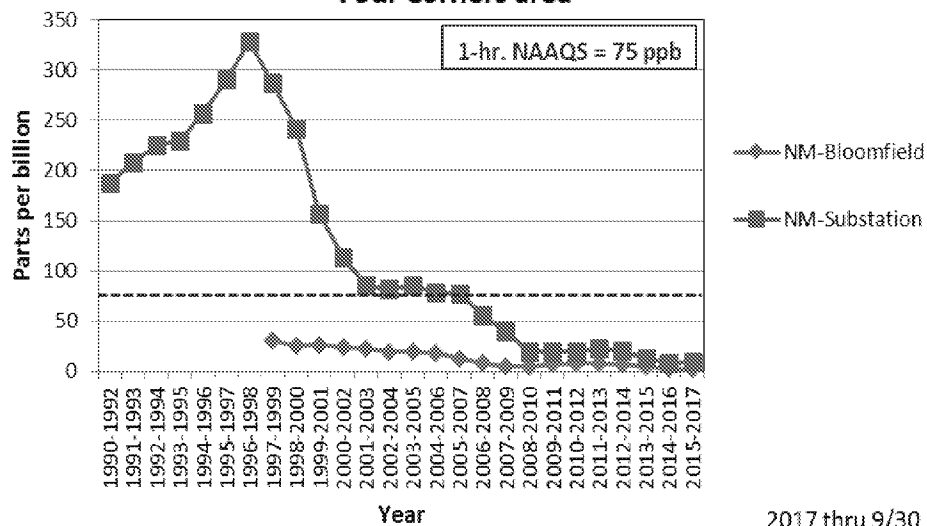
## 1-Hour Nitrogen Dioxide --- 98th Percentile

Four Corners area



## 1-Hour SO<sub>2</sub> --- 3-year Avg. of 99th %ile

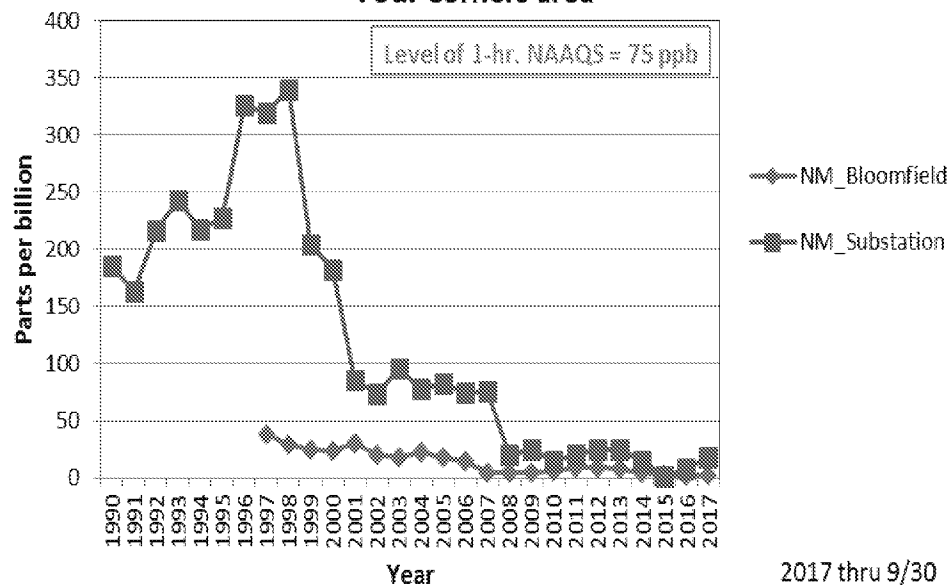
Four Corners area



## Monitoring Trends in the Four Corners Area: Sulfur Dioxide (SO<sub>2</sub>)

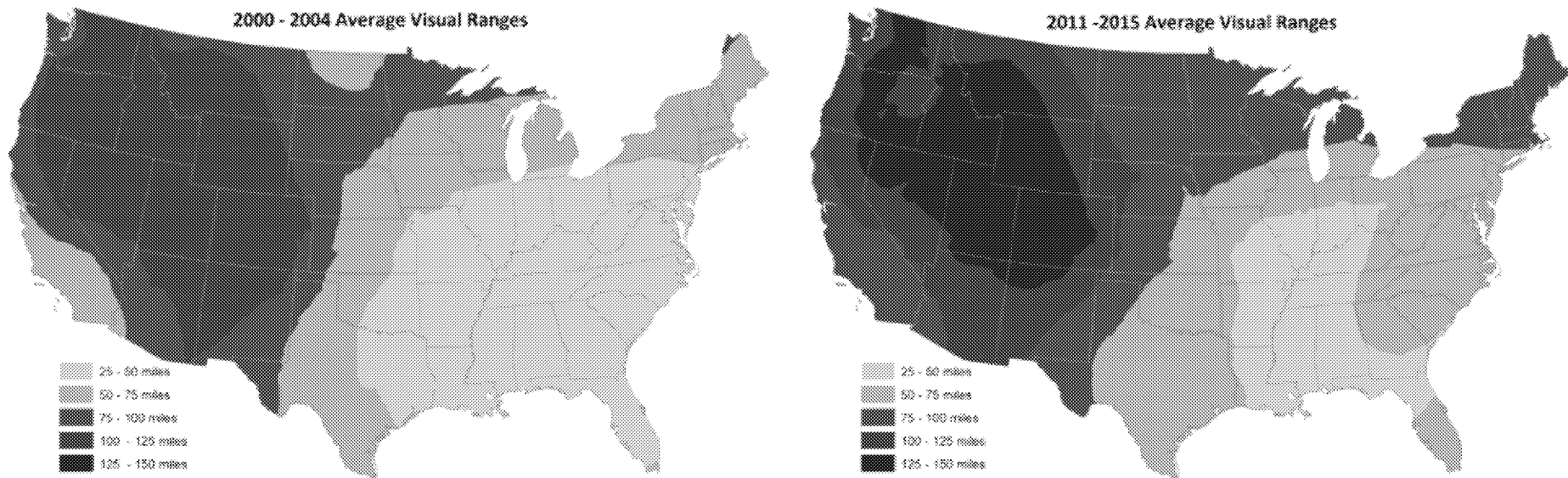
## 1-Hour Sulfur Dioxide --- 99th Percentile

Four Corners area



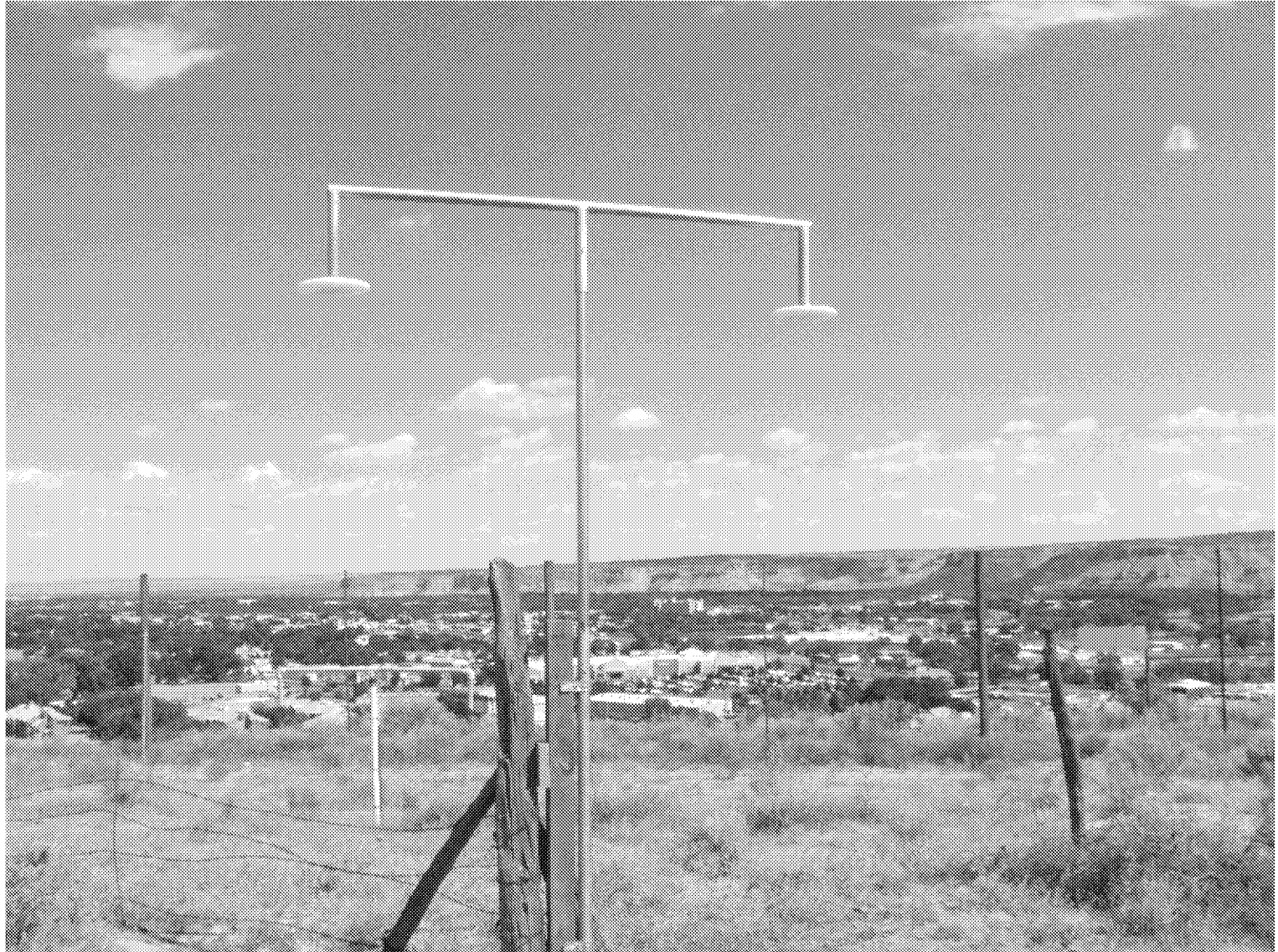
# Visibility

- Nephelometer data at SUIT-Bondad site
- Webcam at Mesa Verde National Park
- IMPROVE data at three regional locations
  - Mesa Verde, Shamrock Mine, Weminuche
- Significant visibility improvements at Mesa Verde and in the Weminuche Wilderness



Courtesy: EPA

# GOM- Dry Deposition Mercury - Farmington Airport



# Next Steps and 2018 plans

- Next Annual Meeting October 24, 2018 in Farmington
- Four Corners Modeling Project is beginning with 2014 basecase and future year 2028 modeling under WRAP workplan.
- Beginning Planning in NM for 95% Ozone statute and continuing regional haze planning.
- Website & listserv: <https://www.env.nm.gov/air-quality/fcaqg/>
- Contact: [Mark.Jones@state.nm.us](mailto:Mark.Jones@state.nm.us) 505-566-9746